

Belden® Expands Line of Low Loss 50 Ohm RF Transmission Cable

NP 182

New flooded

RF coaxial cables

offer superior

water-block

protection in wet

environments.

Today, wireless communications are part of everyone's life. From two-way radios, to cellular phones, to television broadcasting, people communicate more and more through wireless networks. Such networks are constantly evolving, offering additional services that demand greater bandwidth and reliability.

All wireless systems use antennas, which are installed on different types of towers. Although these antennas are used for various applications, they have a similar medium for signal and power transmission: coaxial cable. Now Belden offers an expanded line of 50 ohm (Ω) radio frequency (RF) coax cables specifically engineered for these increasingly demanding wireless environments. New to the series are three gel-filled, water-blocking cables that provide superior protection in excessively wet environments.

Best-in-Class Performance

Belden's 50 Ω RF cables provide best-in-class transmission performance and superior EMI/RFI shielding for greater noise reduction. They are ruggedly constructed and designed to be flexible for ease of installation and routing.

Features include:

Lowest Loss: Belden's 50 Ω RF cables provide the lowest loss of any land mobile radio-type coaxial cables in the market (from 5% to 10% lower, depending on the design and frequency). The result is better signal transmission at the same distance, or longer transmission distance with less attenuation.

All cables are 100% sweep-tested to 6GHz to assure performance in future high frequency applications.

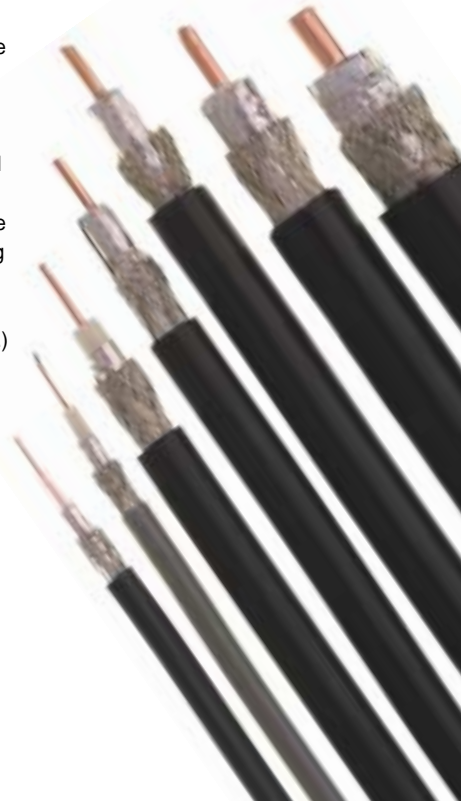
Low VSWR: VSWR is guaranteed to be 1.25:1 maximum over all frequencies (RL = -19dB). See graph on page 5.

High Velocity of Propagation: The foam high-density polyethylene insulation provides the highest velocity of any land mobile radio-type flexible coaxial product on the market. The high-density material properties provide superior crush resistance to minimize impedance variations and return loss, ensuring high performance both before and after installation. (Part number 7805 utilizes a solid PE dielectric.)

Excellent Phase Stability: Belden's 50 Ω RF cables exhibit excellent phase stability over both temperature changes and flexing, resulting in improved signal integrity and reliability.

Superior RF Shielding: The combination foil/braid shield provides in excess of 100dB of effective EMI/RFI shielding.

Unbonded Foil Shields on Smaller Constructions Prevent Connector Shorting: In the smaller designs — RF200 and under — the spacing between the foil shield and the center pin of the connector is extremely small. During the cable stripping process, bonded foil shields tend to tear if not cleanly cut, leaving very small foil "stringers" that can short the shield to the center conductor. Unbonded shields allow for the tape to be cut back from the dielectric, thereby eliminating the potential shorting problem. The unbonded shields are featured on RF100A, RF100LL, RF195 and RF200.





Product Applications

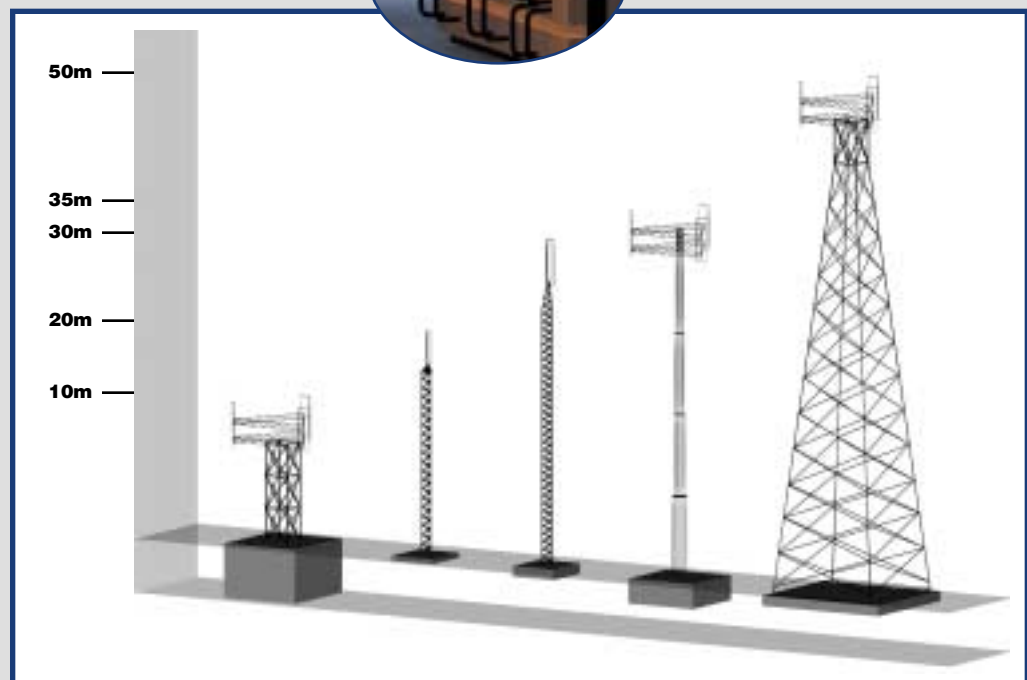
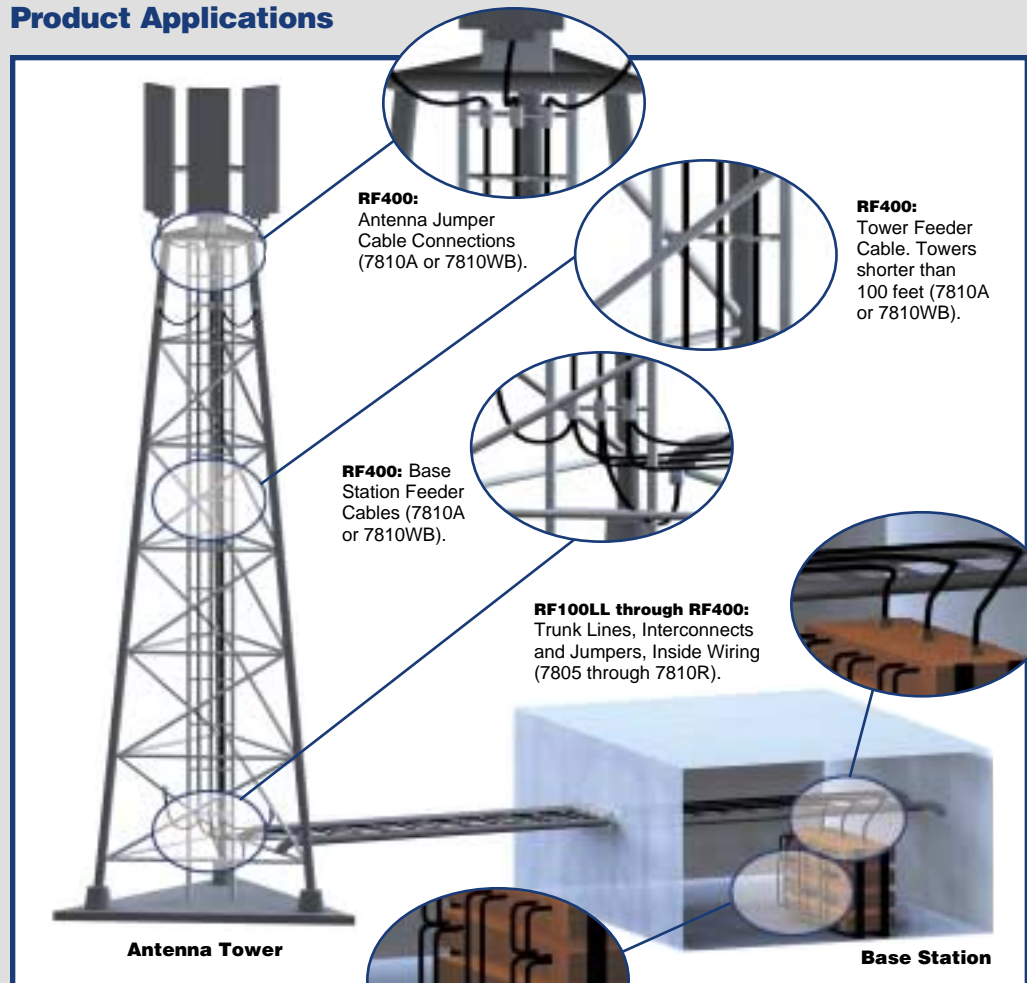
Larger constructions — including the new water-blocked (WB) versions — have sufficient spacing between the shield and center pin, and therefore feature bonded foil shields.

Unique Design: Belden's RF100LL is the only design of its kind. It features a slightly larger center conductor and foam polyethylene insulation, while maintaining the dimensions of the MIL-Spec cable, eliminating the need for special connectors. These two features combined produce an attenuation that is approximately 7% lower than the standard solid polyethylene RF100 design.

Connector Compatibility:

The RF series cables are compatible with all standard land mobile radio-type connectors, including Times Microwave, RF Industries, Amphenol, Trompeter, EF Johnson and others. Please consult Belden's Web site at www.belden.com for a complete listing.

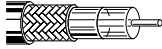
Product Availability: Belden 50Ω RF cables are available with weather-resistant polyethylene jackets and in a PVC-jacketed NEC CMR riser-rated version, as well as the new PE jacketed gel-filled versions, in reels of 500 and 1,000 feet. Contact Belden Electronics Customer Service department at 1-800-BELDEN-1 and request a quote through a Belden distributor.



Various tower configurations that utilize Belden low loss 50 Ohm transmission cable.

Trade No. UL NEC Type CSA Cert.	Standard Lengths		Std. Unit Lbs. ea.	AWG (stranding) [Dia. in In.] Nom. D.C.R.	Insulation & Nominal Core O.D.		Nominal O.D.		No. of Shields & Material Nom. D.C.R.	Nom. Imp. (ohms)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation		
	Ft.	m			Inch	mm	Inch	mm				pF/Ft.	pF/m	MHz	dB/ 100 Ft.	dB 100 m

RG-174 Type



RF100A

Mates with standard RG-174 connectors.

7805 80°C	100	30	6.0	25 (solid)	.061	1.55	.110	2.79	Duofoil® + 90% tinned copper braid 9.1 Ω/M' 29.9 Ω/km	50	66%	31.2	102.4	30	3.8	12.4
	500	152	8.7	.018										Solid Polyethylene	50	4.9
	1000	305	13.0	bare copper	150	8.6	28.2									
				32.0 Ω/M' 105.0 Ω/km	220	10.4	34.2									
					450	15.2	49.9									
					900	22.0	72.3									
					1500	28.7	94.3									
					1800	31.7	104.0									
					2000	33.4	109.7									
					2500	37.8	124.2									
				3000	42.0	137.8										
				4500	52.3	171.5										
				6000	62.0	203.3										

Wire illustrations shown at 200% of actual size.



RF100LL

Mates with standard RG-174 connectors.

7805R 80°C NEC CMR CEC CMG	100	30	2.8	24.5 (solid)	.060	1.52	.110	2.79	Duofoil + 90% tinned copper braid 9.4 Ω/M' 30.8 Ω/km	50	73.5%	26.2	86.0	30	3.5	11.5
	500	152	6.5	.0195										Foamed HDPE	50	4.6
	1000	305	11.0	bare copper	150	8.0	26.1									
				27.3 Ω/M' 94.2 Ω/km	220	9.6	31.6									
					450	14.0	46.1									
					900	20.2	66.4									
					1500	26.6	87.3									
					1800	29.5	96.7									
					2000	31.2	102.3									
					2500	35.4	116.3									
				3000	39.4	129.2										
				4500	50.0	164.2										
				6000	60.6	198.7										

Wire illustrations shown at 200% of actual size.

RG-58 Type



RF195

Mates with standard RG-58 connectors.*

7806A 80°C	500 1000	152 305	4.0 25.0	19 (solid) .037 bare copper	.110	2.79	.195	4.95	Duofoil + 90% tinned copper braid 4.2 Ω/M' 13.8 Ω/km	50	77%	24.3	79.7	30	2.0	6.6
														50	2.5	8.2
														150	4.0	13.3
														220	4.9	16.1
														450	7.1	23.4
7806R 80°C NEC CMR CEC CMG	500 1000	152 305	16.0 29.0	19 (solid) .037 bare copper	.110	2.79	.195	4.95	Duofoil + 90% tinned copper braid 4.2 Ω/M' 13.8 Ω/km	50	77%	24.3	79.7	900	10.3	33.8
														1500	13.7	44.8
														1800	15.2	49.7
														2000	16.1	52.8
														2500	18.3	60.1
	3000	20.5	67.3													
	4500	26.5	86.8													
	6000	32.0	105.0													

Wire illustrations shown at actual size.



RF200

Mates with standard land mobile radio type connectors.*

7807A 80°C	500 1000	152 305	16.0 29.0	17 (solid) .044 bare copper	.116	2.95	.195	4.95	Duofoil + 95% tinned copper braid 4.2 Ω/M' 13.8 Ω/km	50	85%	23.5	77.1	30	1.6	5.4
														50	2.1	7.0
														150	3.7	12.1
														220	4.5	14.6
														450	6.5	21.2
7807R 80°C NEC CMR CEC CMG	500 1000	152 305	16.5 31.0	17 (solid) .044 bare copper	.116	2.95	.195	4.95	Duofoil + 95% tinned copper braid 4.2 Ω/M' 13.8 Ω/km	50	85%	23.5	77.1	900	9.2	30.1
														1500	12.0	39.2
														1800	13.2	43.2
														2000	14.0	45.8
														2500	15.7	51.6
	3000	17.5	57.3													
	4500	22.0	72.3													
	6000	26.0	85.1													

Wire illustrations shown at actual size.

*Please consult Belden's Web site, www.belden.com, for complete listing.

Trade No. UL NEC Type CSA Cert.	Standard Lengths		Std. Unit Lbs. ea.	AWG (stranding) [Dia. in In.] Nom. D.C.R.	Insulation & Nominal Core O.D.		Nominal O.D.		No. of Shields & Material Nom. D.C.R.	Nom. Imp. (ohms)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation		
	Ft.	m			Inch	mm	Inch	mm				pF/Ft.	pF/m	MHz	dB/ 100 Ft.	dB 100 m

RG-8X Type



RF240

Mates with standard RG-8X connectors.*

7808A 80°C	500 1000	152 305	20.0 39.0	15 (solid) .057 bare copper 3.2 Ω/M' 10.5 Ω/km	.150	3.81	.240	6.10	Duobond® II + 95% tinned copper braid 3.5 Ω/M' 11.5 Ω/km	50	86%	23.0	75.5	30	1.3	4.1
					Gas Injected Foamed HDPE					PE jacketed 100% sweep tested						
7808R 80°C NEC CMR CEC CMG	500 1000	152 305	22.0 43.0	15 (solid) .057 bare copper 3.2 Ω/M' 10.5 Ω/km	.150	3.81	.240	6.10	Duobond II + 95% tinned copper braid 3.5 Ω/M' 11.5 Ω/km	50	86%	23.0	75.5	450	4.9	16.1
					Gas Injected Foamed HDPE					PVC jacketed 100% sweep tested Riser rated				900	7.0	22.9
7808WB 80°C	500 1000	152 305	20.0 39.0	15 (solid) .057 bare copper 3.2 Ω/M' 10.5 Ω/km	.150	3.81	.240	6.10	Duobond II + 95% tinned copper braid w/ water- blocking gel 3.5 Ω/M' 11.5 Ω/km	50	86%	23.0	75.5	2000	10.7	35.0
					Gas Injected Foamed HDPE					PE jacketed 100% sweep tested Water-blocked				2500	12.0	39.5
														3000	13.4	43.9
														3500	14.6	47.8
														4500	16.7	54.7
														5800	19.5	63.9
														6000	19.8	65.0

Wire illustrations shown at actual size.

Intermediate Type



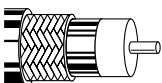
RF300

Mates with land mobile radio type connectors.*

7809A 80°C	500 1000	152 305	22.5 49.0	13 (solid) .072 bare copper 2.0 Ω/M' 6.6 Ω/km	.190	4.83	.300	7.62	Duobond II + 95% tinned copper braid 2.7 Ω/M' 8.8 Ω/km	50	86%	23.0	75.5	30	1.0	3.4
					Gas Injected Foamed HDPE					PE jacketed 100% sweep tested						
7809R 80°C NEC CMR CEC CMG	500 1000	152 305	34.0 65.0	13 (solid) .072 bare copper 2.0 Ω/M' 6.6 Ω/km	.190	4.83	.300	7.62	Duobond II + 95% tinned copper braid 2.7 Ω/M' 8.8 Ω/km	50	86%	23.0	75.5	450	3.9	12.9
					Gas Injected Foamed HDPE					PVC jacketed 100% sweep tested Riser rated				900	5.6	18.3
7809WB 80°C	500 1000	152 305	22.5 49.0	13 (solid) .072 bare copper 2.0 Ω/M' 6.6 Ω/km	.190	4.83	.300	7.62	Duobond II + 95% tinned copper braid w/ water- blocking gel 2.7 Ω/M' 8.5 Ω/km	50	86%	23.0	75.5	1500	7.3	24.0
					Gas Injected Foamed HDPE					PE jacketed 100% sweep tested Water-blocked				1800	8.1	26.5
														2000	8.6	28.2
														2500	9.7	31.9
														3000	10.8	35.4
														3500	11.8	38.7
														4500	13.5	44.4
														5800	15.8	51.8
														6000	16.0	52.6

Wire illustrations shown at actual size.

RG-8 Type



RF400

Mates with 9913 and land mobile radio type connectors.*

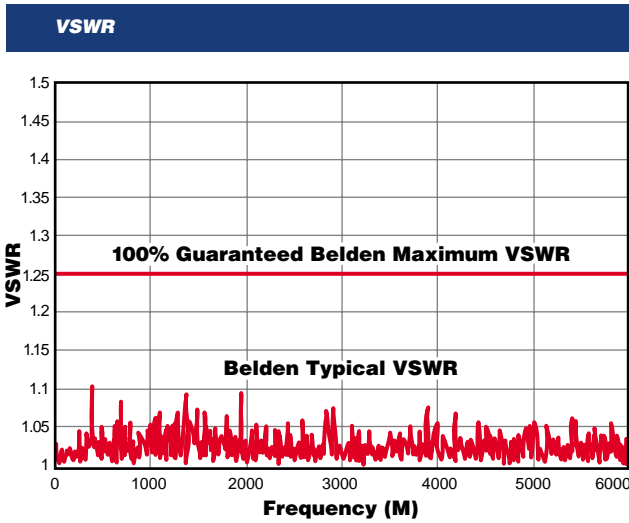
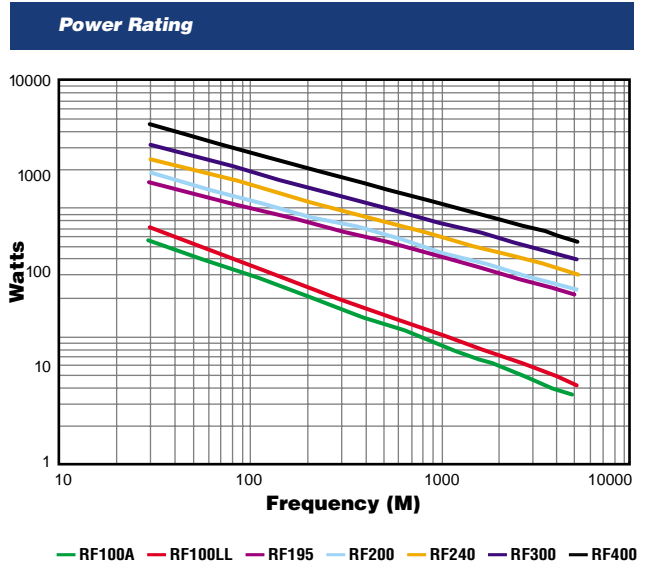
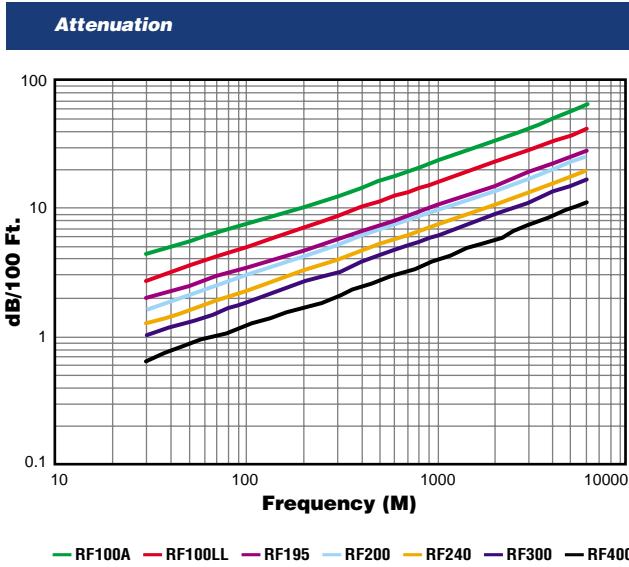
7810A 80°C	500 1000	152 305	52.2 106.0	10 (solid) .108 bare CCA 1.3 Ω/M' 4.4 Ω/km	.285	7.24	.405	10.29	Duobond II + 95% tinned copper braid 1.8 Ω/M' 5.8 Ω/km	50	86%	23.0	75.5	30	.7	2.1
					Gas Injected Foamed HDPE					PE jacketed 100% sweep tested						
7810R 80°C NEC CMR CEC CMG	500 1000	152 305	57.5 116.0	10 (solid) .108 bare CCA 1.3 Ω/M' 4.4 Ω/km	.285	7.24	.405	10.29	Duobond II + 95% tinned copper braid 1.8 Ω/M' 5.8 Ω/km	50	86%	23.0	75.5	150	1.5	4.9
					Gas Injected Foamed HDPE					PVC jacketed 100% sweep tested Riser rated				220	1.8	6.0
7810WB 80°C	500 1000	152 305	52.2 106.0	10 (solid) .108 bare CCA 1.3 Ω/M' 4.4 Ω/km	.285	7.24	.405	10.29	Duobond II + 95% tinned copper braid w/ water- blocking gel 1.8 Ω/M' 5.8 Ω/km	50	86%	23.0	75.5	450	2.7	8.8
					Gas Injected Foamed HDPE					PE jacketed 100% sweep tested Water-blocked				900	3.8	12.6
														1500	5.1	16.6
														1800	5.6	18.5
														2000	6.0	19.6
														2500	6.7	22.0
														3000	7.5	24.4
														3500	8.2	26.9
														4500	9.5	31.1
														5800	11.1	36.4
														6000	11.4	37.3

Wire illustrations shown at actual size.

*Please consult Belden's Web site, www.belden.com, for complete listing.



Electrical Characteristics



Phase Stability

Phase Attribute	Typical range (0.45–6.0GHz)	
	ppm/°C	degree/GHz/m
Temperature (-40° to + 85°C) ¹	±9	±0.6
Bending & Flexing (25 cycles) ²	NA	±1.1

¹: Per IEC 60966-1 clause 8.8
²: Per IEC 60966-1 clause 8.6

Voltage Standing Wave Ratio is a measurement of the reflected power in a cable or instrument. The higher the VSWR the poorer the transmission characteristics of the cable.

RF Cables Cross Reference Guide

RG Type	Cable Type	Belden	Amphenol	Commscope	Harbour Industries	Times Microwave
RG-174	RF100A	7805	—	—	HPP100	LMR®-100A
	RF100LL	7805R	—	—	*	*
RG-58	RF195	7806A	—	WBC™-195	HPF195	LMR-195
	RF195	7806R	—	WBC-195R	*	*
	RF200	7807A	—	WBC-200	HPF200	LMR-200
	RF200	7807R	—	WBC-200R	*	*
RG 8x	RF240	7808A	TWB 2401	WBC-240	HPF240	LMR-240
	RF240	7808R	TWB 2401-FR	WBC-240R	*	*
	RF240	7808WB	—	—	—	—
Intermediate	RF300	7809A	—	WBC-300	HPF300	LMR-300
	RF300	7809R	—	WBC-300R	*	*
	RF300	7809WB	—	—	—	LMR-300-DB
RG 8	RF400	7810A	TWB 4001	WBC-400	HPF400	LMR-400
	RF400	7810R	TWB 4001-FR	WBC-400R	*	*
	RF400	7810WB	—	—	—	LMR-400-DB

* Special Construction

RG Cable Replacement Guide

Part Number	Size	Replacing
7805	RF100A	RG-174/U
7805R	RF100LL	RG-174/U
7806A	RF195	RG-58/U
7807A	RF200	RG-58/U
7808A	RF240	RG-8X
7809A	RF300	RG-8X
7810A	RF400	RG-8/U

For More Information:

Belden Electronics Division
Technical Support:

1-800-BELDEN-1 or
1-800-BELDEN-3

www.belden.com